through interactions with other parts of the secretion machinery, causes the signal sequence to be inserted into the membrane. Once the signal sequence has crossed the membrane, the remainder of the peptide is extruded. Signal peptidase-I is a periplasmic component of the export machinery that cleaves off the signal peptide. Thus, for the purposes of the present invention, the identity of the signal peptide is much less important than are the other parts of the fusion protein. It is sufficient that the signal peptide directs the fusion to be secreted through the lipid bilayer. Thus, we may substitute DNA coding on expression for the phoA or bla signal peptides for the DNA that codes for the putative signal peptide of gene VIII. What is much more important is the retention of the mature gene VIII coat protein. This 50 amino-acid fragment can co-assemble with authentic gene VIII coat protein so that the joined initial potential binding domain.

Mature gene VIII protein makes up the sheath around the circular ssDNA. The 3D structure of f1 virion is known at medium resolution; the amino terminus of gene VIII protein is on surface of the virion. No fusions to M13 gene VIII protein have been reported. The 2D structure of M13 coat protein is implicit in the 3D structure. Mature M13 gene VIII protein has only one domain. There are four minor proteins: gene III, VI, VII, and IX. Each of these minor proteins is present in about 5 copies per virion and is related to morphogenesis or infection. The major coat protein is present in more than 2500 copies per virion.

Gene III protein is synthesized as a preprotein having a typical signal peptide of 18 amino acids. Parmley and Smith (PARM88) report inserting exogenous DNA